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A new *Bembidion* subg. *Trepanes* Motschulsky, 1864 from Iran (Coleoptera Carabidae)

Abstract - A new species, *Bembidion (Trepanes) sengleti* n. sp. from northern Iran is described here and compared with *B. (Trepanes) octomaculatum* Goeze, 1777. Some considerations about the systematics of the subgenus are also given.

Key words: Coleoptera, Carabidae, Bembidiina, *Bembidion*, *Trepanes*, *Leja*, *Metallina*, *Philochtus*, Iran, Palaeartic region, taxonomy.

Riassunto - Una nuova specie di *Bembidion* subg. *Trepanes* Motschulsky, 1864 dall'Iran (Coleoptera Carabidae).

In questo lavoro è descritta una nuova specie dell'Iran settentrionale, *Bembidion (Trepanes) sengleti* n. sp., e comparata con *B. (Trepanes) octomaculatum* Goeze, 1777. Vengono inoltre fatte alcune considerazioni sulla sistematica del sottogenere.

Parole chiave: Coleoptera, Carabidae, Bembidiina, *Bembidion*, *Trepanes*, *Leja*, *Metallina*, *Philochtus*, Iran, regione Palearctica, tassonomia.

Introduction

Studying unidentified Iranian material of the Farkač collection and of the Geneva Museum we found some specimens extremely similar in habitus to *B. (Trepanes) octomaculatum* Goeze, 1777 (Figs. 2–4) but showing paler elytra, as in *B. (Trepanes) articulatum* Panzer, 1796. The examination of the male genitalia of the Iranian specimens confirms that it is a new taxon.

Since at present we could not examine any Iranian specimens of *B. octomaculatum* and the taxonomical differences between the two taxa are relatively slight, perhaps the new taxon herewith described could be intended as subspecific. In the meantime, waiting for a better knowledge of its distribution, it is brought forward as good species. This study is based on the comparison of the type series of the species herewith described with 530 specimens of *B. octomaculatum* (CB, CBP,

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CC, CF, CFk, CM, CP, CS, CT, HUMB, MCVR, NMW, OUMNH, SMNS, ZSM) from almost all the regions of its distribution.

The subtribe Bembidiina is intended here *sensu* Marggi *et al.* (2003).

During this study one of us (L.T.) could examine a specimen of *B. octomaculatum* from Victoria Falls, Zimbabwe (CB). We believe that the known distribution of this Palearctic species (the southernmost populations live in northern Africa) suggests that this record is due to human introduction or to a wrongly labelled specimen. Therefore in our opinion the distribution of this species still has to be considered Palearctic.

Materials and methods

This paper is based on the study of 552 specimens belonging to the new species (22) and *B. octomaculatum* (530). Sources of material are the collections of the following institutions and specialists:

CB	Coll. Baehr, München
CBP	Coll. Bulirsch, Prague
CC	Coll. Cooter, Hereford
CF	Coll. Facchini, Piacenza
CFk	Coll. Farkač, Prague
CM	Coll. Marggi, Thun
CP	Coll. Pavesi, Milano
CS	Coll. Sciaky, Milano
CT	Coll. Toledano, Verona
OUMNH	Hope Entomological Collections, Oxford University Museum of Natural History
HUMB	Humboldt–Universität Museum für Naturkunde, Berlin
MHNG	Muséum d'Histoire naturelle, Genève
MSNM	Museo Civico di Storia Naturale, Milano
NMW	Naturhistorisches Museum, Wien
SMNS	Staatliches Museum für Naturkunde, Stuttgart
ZSM	Zoologische Staatssammlung, München

The measurements, made with a Leica MZ12 stereomicroscope at 25 x (body) and 100 x (median lobes of aedeagi), are expressed in the text by these abbreviations:

pw/pl	pronotum width / pronotum length ratio
el/ew	elytral length / elytral width ratio
ew/pw	elytral width / pronotum width ratio

The body length was measured using card-mounted specimens, from the front margin of the clypeus to the apex of the elytra. The pronotal length is measured along the midline.

Dissections were made using standard techniques. Genitalia and small parts were preserved in Euparal on acetate labels fixed on the same pins as the specimens. Photographs were taken with a Nikon Coolpix 995 digital camera on a Leica MZ12 stereomicroscope. Drawings of the aedeagi were made by correcting images taken with a Nikon Coolpix 995 digital camera on the same microscope with the Adobe Photoshop® Elements 3.0 program on a Macintosh Powerbook G4 computer.

Bembidion (Trepanes) sengleti n. sp.
(Figs. 1, 3)

Systematic notes. This species belongs to a subgenus involved in a nomenclatorial problem. Two names, *Leja* Dejean, 1821 and *Trepanes* Motschulsky, 1864, were used by authors in the literature for the same subgenus. In fact Kryzhanovskij *et al.* (1995), Vigna Taglianti (1993) and Guéorguiev & Guéorguiev (1995) used the older name *Leja* Dejean, 1821 while the majority of authors consider as valid the more recent name *Trepanes* Motschulsky, 1864 (Netolitzky, 1942–43; Jedlicka, 1965; Lorenz, 1998, 2005; Marggi *et al.*, 2003; Müller-Motzfeld, 2004; Vigna Taglianti, 2004, 2005; Ortuño & Toribio, 2005).

Thanks to the collaboration of a number of colleagues (Augusto Vigna Taglianti, Paolo Bonavita, Charles Huber, Paolo Neri, personal communications) we decided to use here the name *Trepanes* Motschulsky, 1864. Some notes about the history of the treatment of this matter are given below.



Figs. 1–2 - Habitus of: 1 – *Bembidion (Trepanes) sengleti* n. sp., paratype from NW Iran Garbi 2,500 m, Takht-e-suleiman 10 km SE 36.36N 47.20E (CT); 2 – *Bembidion (Trepanes) octomaculatum* Goeze from Ljubiana, Slovenia (CT); scale = 1mm.

Figg. 1–2 - Habitus di: 1 – *Bembidion (Trepanes) sengleti* n. sp., paratipo dell' Iran nordoccidentale, Garbi 2.500 m, Takht-e-suleiman 10 km SE 36.36N 47.20E (CT); 2 – *Bembidion (Trepanes) octomaculatum* Goeze di Ljubiana, Slovenia (CT); scala = 1mm.

The authors using the name *Leja* Dejean, 1821 followed the decisions taken by Silfverberg (1983), who pointed out: “Type species as designated by Duponchel (in d’Orbigny 1842): *Carabus sturmii* Panzer, 1804, which is listed as synonym of *Bembidion octomaculatum* (Goeze, 1777). Thus *Leja* is a senior subjective synonym of *Trepanes* Motschulsky, 1864, which is generally listed as subgenus of *Bembidion*. *Leja* has also mistakenly been considered a junior homonym of *Leia* Meigen, 1818 (Diptera), but the one letter difference is sufficient to make *Leja* available”.

According to this statement, the name *Leja* Dejean, 1821 should be valid and attributable to the subgenus studied in this paper.

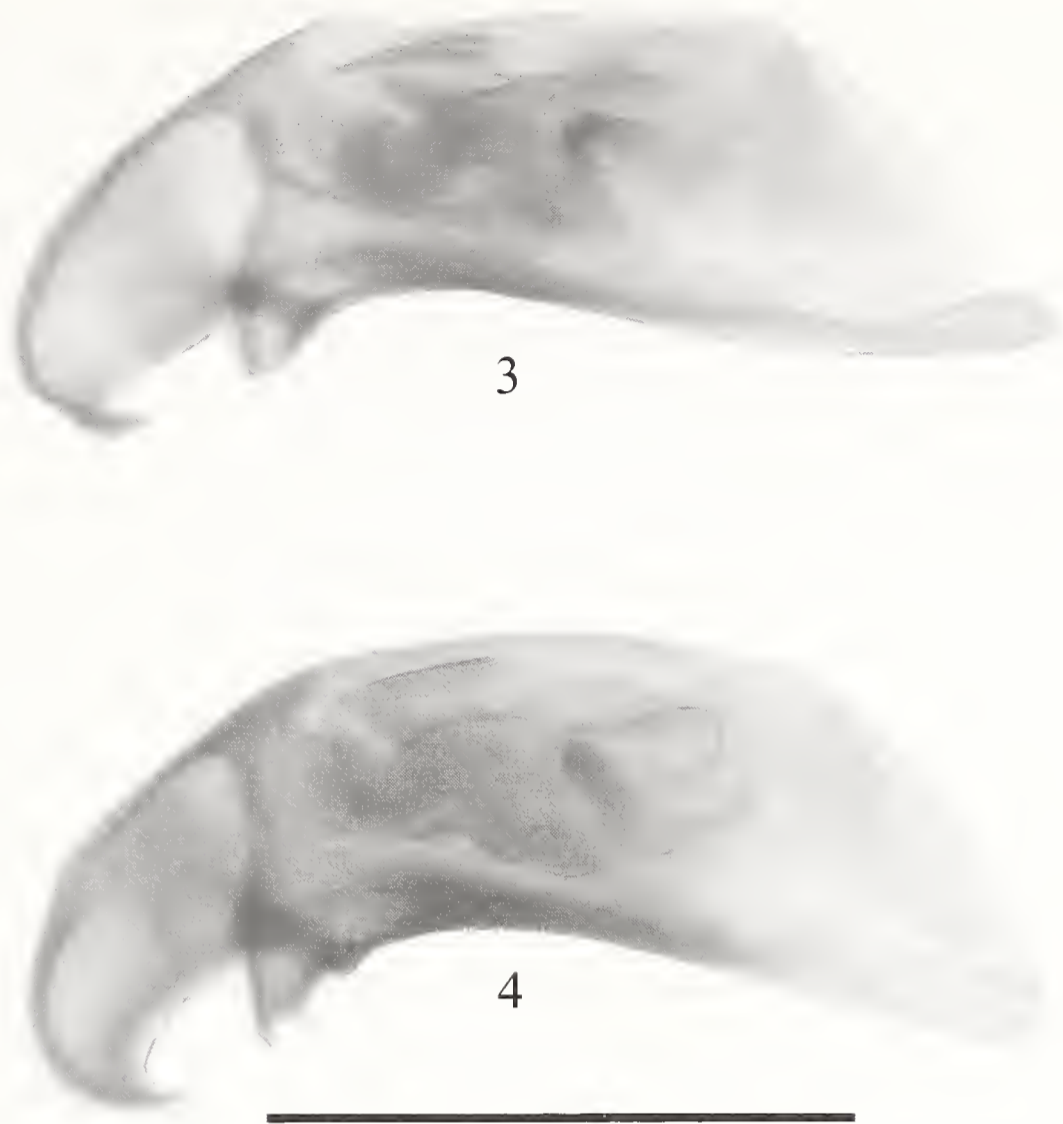
More recently, Bousquet (2002) pointed out that the name *Metallina* Motschulsky, 1850 was proposed as a replacement name for *Leja* Dejean, 1821, “which was uncorrectly presumed to be a junior homonym of *Leia* Meigen, 1818. Therefore both *Leja* and *Metallina* must have the same type species (ICZN, 1999, Art. 67.8). The first valid type species designation for *Leja* Dejean is that of *Carabus biguttatus* Fabricius, 1779 by Hope (1838: 61, under the spelling *Leja*), not that of *Carabus sturmii* Panzer, 1803 (= *Carabus octomaculatus* Goeze, 1777) by Duponchel (1842: 542) or that of *Carabus celer* Fabricius, 1792 (= *Carabus lampros* Herbst, 1784) by Chenu (1851: 192) as generally accepted. However, acceptance of Hope’s or Duponchel’s designation would imply nomenclatural changes in the genus *Bembidion* Latreille, 1802 and in my opinion these nomenclatorial acts should be suppressed. The case is to be referred to the Commission for a ruling (ICZN, 1999, Art. 70.2). Meanwhile, *Carabus celer* Fabricius should be retained as the type species of *Leja* Dejean and *Metallina* Motschulsky. The fact that Dejean’s name is not a junior homonym makes it the valid name for the species currently held in *Metallina* Motschulsky, 1850. In order to maintain *Metallina* Motschulsky as a valid subgenus of *Bembidion* Latreille, 1802 a request should be submitted to the Commission to suppress *Leja* Dejean for the principle of priority as advocated by Lorenz (1998b: 105)”.

We agree with Bousquet (2002) that the best choice should be the suppression of the name *Leja* Dejean, 1821 in order to preserve the name *Philochtus* Stephens, 1828 (type species *Bembidion biguttatum* Fabricius), universally known and used by the specialists of last 175 years.

Waiting for a definitive decision on this matter, and since, according to Bousquet (2002), the name *Leja* Dejean, 1821 is not referred to the subgenus studied in this paper, the subgeneric name *Trepanes* Motschulsky, 1864 will be used for the new species described here.

The designation of the type species of the subgenus *Trepanes*, *Carabus articulatus* Panzer, 1796 (= *Bembidion articulatum* Panzer, 1796) is given by Jeannel (1941).

Diagnosis. *B. sengleti* n. sp. (Fig. 1) is a *Bembidion* of the subgen. *Trepanes* Motschulsky, 1864 showing elytra clearly lighter than in *octomaculatum* (Fig. 2), with elytral pattern similar to that of *B. articulatum*, pronotum with base slightly narrower and straight basal part of lateral border longer than in *B. octomaculatum* and aedeagus with rectilinear ventral border (slightly convex in *B. octomaculatum*, Fig. 4) and apex slightly wider than in *B. octomaculatum*.



Figs. 3-4 - Median lobe of aedeagus of: 3 - *Bembidion (Trepanes) sengleti* n. sp., paratype from NW Iran Garbi 2,500 m, Takht-e-suleiman 10 km SE 36.36N 47.20E (CT); 4 - *Bembidion (Trepanes) octomaculatum* Goeze from Artvin, Turkey (CT); scale = 0.5 mm.

Figg. 3-4 - Lobo mediano dell'edeago di: 3 - *Bembidion (Trepanes) sengleti* n. sp., paratipo dell' Iran nordoccidentale, Garbi 2.500 m, Takht-e-suleiman 10 km SE 36.36N 47.20E (CT); 4 - *Bembidion (Trepanes) octomaculatum* Goeze di Artvin, Turchia (CT); scala = 0.5 mm.

Type locality. Iran Kurdistan, E. of Marivan, 35°32N / 46°20E.

Type series. Holotype: ♂, "Iran Kordestan, E. de Marivan, 35°32N / 46°20E, A. Senglet 16.9.75" (MHNG). Paratypes: 3 ♂♂, 2 ♀♀, same date and locality as the Holotype (MHNG, MSNM, CM, CT); 1 ♀, "Iran Kordestan, Marivan, 35°32N / 46°09E, A. Senglet 15.9.75" (MHNG); 1 ♂, "Iran Azerbaidjan OCC., N. de Saghez, 36°23N / 46°12E, A. Senglet 18.9.75" (MHNG); 1 ♂, "Iran Kordestan, Hoseynabad, 35°33N / 47°08E, A. Senglet 17.9.75" (MHNG); 1 ♂, 1 ♀ "Iran Kordestan, S.E. de Kal'eh Dju, 35°19N / 46°20E, A. Senglet 14.9.75" (MHNG, CT); 1 ♂, 1 ♀, "Iran Ilam, Sarab Eyvan, 33°45N / 46°22E, A. Senglet 26.6.74" (MHNG, CM); 1 ♂, "Iran Lorestan, Malavi-Shahabad 1,400 m, 33°35N / 47°14E, A Senglet 25.6.74" (MHNG); 2 ♀♀, "Iran Kermanshah, Mahi Dasht 4.VIII.73, 34°14N / 46°42E, A. Senglet" (MHNG); 1 ♂, 1 ♀, "Iran Kermanshah, Kenesht / Kermanshah, 34°29N / 47°09E, A. Senglet 3.VIII.73" (MHNG, CM); 1 ♂, 3 ♀♀, "NW Iran Garbi 2,500 m, Takht-e-suleiman 10 km SE 36.36N 47.20E, 10.VI.2000" (CFk, CT).

Derivatio nominis. The name of the species is dedicated to Antoine Senglet from Vich, Switzerland, the collector of most specimens of the type series.

Description. Length 2.76 to 2.92 mm. Colour as in *Bembidion articulatum*: head and pronotum metallic black, shiny, with faint greenish reflection, clypeus reddish. Elytra reddish, with some lighter and darker areas. From base to the apex, interval 3 with basal fourth lighter, a small dark brown spot surrounding the anterior discal pore, then lighter again up to the mid-elytral length. Diagonal light spot from interval 3 to 8 at about the apical three-quarters. This light spot anteriorly bordered by a dark spot as wide as the light one and surrounding this last near the lateral elytral border. Legs red, antennomeres 1 and 2 red, 3 and 4 reddish infuscated only on the tip, remaining antennomeres infuscated.

Head small with convex eyes and typical frontal furrows of subg. *Trepanes* Motschulsky, deep and convergent. Legs and antennae short.

Pronotum ($pw/pl = 1.27$ to 1.28) ($ew/pw = 1.5$) cordate, strongly convex, with extremely rounded sides, more evidently sinuate near base than in *B. octomaculatum*. Hind angles acute, with a seta, evidently advanced in respect of the basal border, which is arcuate. Laterobasal carina short, but evident. Basal foveae rounded, small and deep, basal transverse impression with very coarse punctures. Median line and anterior transverse line superficial. Basal margin narrower than anterior.

Metaventral process bordered.

Elytra ($el/ew = 1.49$ to 1.51) with square shoulders and gently rounded sides. Maximum elytral width slightly behind middle. Striae punctured, stria 1 reaching apex, the others evanescent at the apical third. Stria 7 evident. Two discal pore punctures in the third interval.

Microsculpture absent in the whole body, only a trace of some isodiametric sculpticells on the neck.

Male genitalia (Fig. 3). Median lobe of aedeagus with a pair of crossed main sclerites probably analogue of sclerites *alpha* and *sigma* of subg. *Bembidion s. str.* (Toledano, 1999). Another, short sinuate sclerite at the apical end of the main ones shows a curved process with dorsal concavity.

Female genitalia. Spermatheca simple, showing long duct with several coils, very poorly sclerotized, reservoir small, "figure eight-shaped", apparently divided in two cavities, one of them subspherical, the second cordiform, slightly wider than the first one. Annulus receptaculi not sclerotized.

Distribution. Known only from northern Iran.

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References

- Bousquet Y., 2002 - Additions and corrections to the world catalogue of genus-group names of Geadephaga (Coleoptera) published by Wolfgang Lorenz (1998). *Folia Heyrovskyana, Supplementum*, 9.
- Guéorguiev V. B. & Guéorguiev B. V., 1995 – Catalogue of the ground-beetles of Bulgaria (Coleoptera: Carabidae). *Pensoft Publisher*, Sofia–Moscow.
- Jeannel R., 1941 - Coleoptères Carabiques 1., Faune de France 39, *Lechevalier*, Paris.
- Jedlicka A., 1965 - Monographie der Tribus Bembidiini aus Ostasien (Col.Carab.). *Entomologische Abhandlungen der Staatliches Museum für Tierkunde in Dresden*, Dresden, 32: 79–199.
- Kryzhanovskij O. L., Belousov I. A., Kabak I. I., Kataev B. M., Makarov K. V. & Shilenkov V. G., 1995 - A Checklist of the Ground-Beetles of Russia and Adjacent Lands (Insecta, Coleoptera, Carabidae). *Pensoft Publishers*, Sofia–Moscow.
- Lorenz W., 1998 - A systematic list of extant ground beetles of the world (Coleoptera “Geadephaga”: Trachypachidae and Carabidae incl. Paussinae, Cicindelinae, Rhysodinae), Tutzing, Germany, (published by the author).
- Lorenz W., 2005 - A systematic list of extant ground beetles of the world (Coleoptera “Geadephaga”: Trachypachidae and Carabidae incl. Paussinae, Cicindelinae, Rhysodinae). 2nd edition. – Tutzing, Germany, (published by the author).
- Marggi W. A., Huber C., Müller–Motzfeld G. & Hartmann M., 2003 - Bembidiini. In: Catalogue of Palaearctic Coleoptera. Volume 1. Archostemata – Myxophaga – Adephaga. Löbl I. & Smetana A. (eds.). *Apollo Books*.
- Müller-Motzfeld G., 2004 - Bd. 2 Adephaga 1: Carabidae (Laufkäfer). In: Die Käfer Mitteleuropas. Freude H., Harde K. W., Lohse G. A. & Klausnitzer B. (eds.). *Spektrum Verlag (Heidelberg/Berlin)*, 2 Auflage.
- Netolitzky F., 1942–1943 - Bestimmungstabelle der *Bembidion*-Arten des paläarktischen Gebietes. *Koleopterologische Rundschau*, Wien, 28 (1942): 29–68; 28 (1943a): 69–124; 29 (1943b): 1–70.
- Ortuño V. M. & Toribio M., 2005 - Carabidae de la Península Ibérica y Baleares. Vol. I. Trechinae, Bembidiini. *Argana Editio*, Barcelona.

- Silfverberg H., 1983 - The coleopteran genera of Dejean 1821. I Carabidae. *Acta entomologica Fennica*, 49: 115–116.
- Toledano L., 1999 - Revision of the palaeartic species of the subgenus *Bembidion* with description of three new taxa from China (Coleoptera, Carabidae, Bembidiini). In: *Advances in Carabidology. Papers dedicated to the memory of Prof. Dr. Oleg L. Kryzhanovskij. Zamotajlov A. & Sciaky R. (eds.). MUIISO publ., Krasnodar: 195–227.*
- Toledano L., 2000 - Systematic notes on the palaeartic Bembidiini with particular reference to the fauna of China (Coleoptera Carabidae). *Memorie della Società Entomologica Italiana*, Genova, 78: 5–70.
- Toledano L., 2002 - Nomenclatorial revision of the supraspecific taxa of Bembidiini s. str. of South America described by Jeannel (1962) and related taxa with some considerations on the fauna of South America. *Koleopterologische Rundschau*, Wien, 72: 1–14.
- Vigna Taglianti A., 1993 - Checklist delle specie della Fauna d'Italia. Coleoptera Archostemata, Adephaga 1 (Carabidae). *Edizioni Calderini*, Bologna: 1–51.
- Vigna Taglianti A., 2004 - Family Carabidae. In: *Coleoptera. Fauna Europaea*, P. Audisio (ed.). (web edition version 4.XI.2004) <http://www.faunaeur.org/>
- Vigna Taglianti A., 2005 - Checklist e corotipi delle specie di Carabidi della fauna italiana. In: *I Coleotteri Carabidi per la valutazione ambientale e la conservazione della biodiversità*. APAT, Agenzia per la protezione dell'ambiente e per i servizi tecnici, Manuali e Linee Guida, 34: 186-225.

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